

*Florida*.—Jacksonville, 12th, 15th; Pensacola, 6th; Cedar Keys, 12th.

*California*.—Los Angeles, 1st; Riverside, 1st, 2d, 4th, 6th.

*Georgia*.—Quitman, 8th, 14th, 15th, 23d.

*Louisiana*.—Alexandria, 10th, 19th, 24th to 26th; New Orleans, 8th, 13th, 14th.

*Mississippi*.—University, 12th, 13th, 15th; Vicksburg, 7th, 8th, 11th to 13th, 22d.

The following reports of destructive frosts have been received: Charlotte, N. C.: the peach crop was reported to have been injured by the cold weather on the 23d.

Aiken, Aiken Co., S. C.: the frost of the 23d caused serious injury to the fruit crop; vegetation generally was damaged.

Savannah, Ga.: truck farmers report that the heavy frost on the 23d damaged vegetables to some extent.

Milledgeville, Baldwin Co., Ga.: the cold wave on the 23d was very destructive to tender vegetation; the peach crop was injured to a great extent.

Springfield Mo.: the peach buds were very much damaged by the frost on the 22d.

#### TEMPERATURE OF WATER.

The following table shows the temperature of the sea-water for March, 1888, observed, under conditions as given, at the harbors of the several stations; the monthly range of water temperature; the average depth at which the observations were made, and the mean temperature of the air:

Station.	Temperature at bottom.				Mean temperature of air at the station.	Average depth of water in feet and tenths.
	Max.	Min.	Range.	Monthly mean.		
Canby, Fort, Wash.	o	o	o	o	o	o
Cedar Keys, Fla.	71.0	56.0	15.0	63.5	61.4	8.2
Charleston, S. C.	62.5	49.5	13.0	53.6	55.2	34.3
Eastport, Me.	34.5	32.2	2.3	33.4	29.0	16.5
Galveston, Tex.	65.5	53.0	12.5	61.2	60.1	14.9
Key West, Fla.	o	o	o	o	o	o
New York City	39.3	29.7	9.6	32.3	32.0	14.8
Pensacola, Fla.	66.8	57.5	9.3	61.5	59.5	17.8
Portland, Me.	34.8	30.0	4.8	32.0	29.8	15.7
Portland, Oregon	49.5	43.0	6.5	46.0	46.2	51.9

\* No thermometer at station.

#### PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for March, 1888, as determined from the reports of about eight hundred stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures opposite the names of the geographical districts in columns for mean temperature, precipitation, and departures from the normal, show respectively the average for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal, and subtracting when above.

In Florida, along the coasts of South Carolina and Georgia, in parts of the Lake region, New England, the southern slope, plateau districts, North Carolina, and Pacific coast, the precipitation of March, 1888, was below the average. No extended area of deficiency is shown, however, and, with the exception of northern Florida, where the rainfall was very light, the departures from the normal were not marked. Over much the larger portion of the country the rainfall exceeded the average for March. In portions of the east Gulf states the monthly rainfalls of more than ten inches occurred; in the west Gulf states, portions of Tennessee, Virginia, and the Carolinas, and in southern New England, the precipitation was also very heavy, being largely in the form of snow in the last-named district. On the Pacific coast the rainfall was below the average in Oregon, and above the average in California and Washington; at Portland, Oregon, only about 45 per cent. of the average amount fell, while at San Diego, Cal., it was about double the average.

#### SNOW.

Only the dates of snow in Southern States are given, which are as follows:

*Arkansas*.—Fort Smith, 6th, 20th; Little Rock, 6th.

*Mississippi*.—University, 6th.

*North Carolina*.—Wash Woods, 14th, 22d.

*Texas*.—Abilene, 6th, 20th; Fort Davis, 13th; Fort Elliott, 5th, 21st, 26th, 27th.

#### MONTHLY SNOWFALLS (in inches and tenths).

Monthly snowfalls of March generally ranged from 5 to 12 inches in Dakota and Nebraska, and thence eastward to the Atlantic coast, except northern Michigan, portions of New York, and in New England, where the fall was much greater. At Albany, N. Y., slightly more than 50 inches fell, and over a large part of New England the total monthly snowfalls ranged from 30 to 40 inches. In eastern Pennsylvania, north-

ern New Jersey, and in portions of West Virginia the monthly snowfalls ranged from 20 to 30 inches. East of the Mississippi River, to the south of the thirty-fifth parallel, no appreciable amount of snow fell, and to the west of the Mississippi, none fell to the south of the parallel mentioned, except in mountain regions.

#### DEPTH OF UNMELTED SNOW ON GROUND AT END OF MONTH.

[Expressed in inches and tenths.]

At the close of March there was no unmelted snow on the ground, except in northern districts. In Montana, Dakota, Minnesota, and northern Iowa the depth ranged from 1 to 10. In the northern portions of Michigan and Wisconsin depths ranging from 10 to 36 are reported. In Pennsylvania there was none in the southern part of the state and from 6 to 18 in the northern part. In some portions of New York, Vermont, New Hampshire, and Maine there were from 20 to 37 of snow on the ground at the end of the month, while in other portions there was very little.

#### SLEET.

During March there were but few days on which sleet did not occur in some part of the country, viz., the 6th, 7th, 15th, and 16th. From the 24th to 26th severe sleet storms occurred in Illinois, Indiana, Iowa, Nebraska, and Wisconsin, concerning which these reports are given:

Springfield, Ill.: during the storm on the 24th all electric wires were heavily coated with ice, and many were broken, causing serious interruption to telegraphic communication.

Charleston, Coles Co., Ill.: the sleet storm during the night of the 24-25th damaged fruit trees to a considerable extent in this county.

Crete, Saline Co., Nebr.: the sleet storm of the 25th was the severest known for many years; much damage was done to orchards and shade trees.

Vevay, Switzerland Co., Ind.: the sleet storm of the 24-25th covered all exposed objects with a heavy coat of ice, and many trees were broken.

Dana, Vermillion Co., Ind.: the severest sleet storm of the year occurred on the 26th; trees of all kinds were injured, the smaller fruit trees sustaining the greatest damage.

#### PRECIPITATION FROM A CLOUDLESS SKY.

Columbus, Ohio: snow fell from a clear sky from 9.10 to 9.25 p. m. on the 11th.

#### DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for March, 1888; (4) the departures of the current month from the average;

(5) and the extreme monthly precipitation for March during the period of observations and the year of occurrence:

State and station.	County.	(1) Average for the month of March.	(2) Length of record.	(3) Total for March, 1888.	(4) Departure from average.	(5) Extreme monthly precipitation for March.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
<i>Arkansas.</i>		<i>Inches</i>	<i>Years</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>		<i>Inches</i>	
Lead Hill	Boone	3.71	6	3.95	+0.24	4.87	1866	2.84	1887
<i>California.</i>									
Sacramento	Sacramento	2.42	22	3.80	+1.38	7.63	1884	0.09	1885
Salinas	Monterey	2.13	16	3.28	+1.15	5.09	1884	0.19	1885
<i>Florida.</i>									
Merritt's Island	Brevard	2.96	11	1.46	-1.50	7.92	1878	0.76	1882
<i>Illinois.</i>									
Golconda	Pope	3.28	10	6.59	+3.31				
Peoria	Peoria	2.66	32	4.03	+1.37				
Riley	McHenry	2.52	27	2.34	-0.18				
<i>Indiana.</i>									
Blue Lick	Clark	3.08	11	5.41	+2.33	5.41	1888	1.02	1885
Logansport	Cass	2.98	33	3.08	+0.10	5.82	1869		
Spiceland	Henry	3.90	28	3.76	-0.14	7.40	1876	0.70	1885
Vevay	Switzerland	3.89	21	4.23	+0.34	6.30	1882	1.04	1872
<i>Iowa.</i>									
Cresco	Howard	1.81	15	4.55	+2.74				
<i>Kansas.</i>									
Lawrence	Douglas	2.14	20	5.47	+3.33	5.47	1888	0.37	1879
Wellington	Sumner	1.24	10	1.24	0.00	2.73	1881	0.00	1879
<i>Louisiana.</i>									
Point Pleasant	Tensas	4.71	8	6.40	+1.69				
Grand Coteau	Saint Landry	5.91	6	5.92	+0.01				
<i>Maine.</i>									
Gardiner	Kennebec	3.97	50	5.09	+1.12	10.06	1859	0.90	1856
<i>Maryland.</i>									
Cumberland	Alleghany	2.89	16	3.15	+0.26	4.50	1882	1.30	1885
<i>Massachusetts.</i>									
Somerset	Bristol	4.59	18	6.49	+1.90				
Worcester	Worcester	3.55	49	8.37	+4.82				
<i>Nevada.</i>									
Carson City	Ormsby	1.51	9	0.54	-0.97	4.22	1882	0.23	1887
<i>Michigan.</i>									
Thornville	Lapeer	2.54	12	2.12	-0.42				
Kalamazoo	Kalamazoo	2.72	13	2.22	-0.50				
<i>New Jersey.</i>									
Moorestown	Burlington	3.48	25	5.39	+1.91	5.78	1875	1.08	1885
South Orange	Essex	3.94	18	8.20	+4.26	8.20	1888	0.81	1885
<i>New York.</i>									
Palermo	Oswego	2.80	35	1.89	-0.91	6.00	1873	0.68	1885
<i>Ohio.</i>									
Wauseon	Fulton	2.89	15	3.64	+0.75	6.52	1876	0.62	1885
<i>Oregon.</i>									
Albany	Linn	3.89	9	3.34	-0.55				
<i>Pennsylvania.</i>									
Dryberry	Wayne	3.12	29	4.01	+0.89	5.78	1871	1.03	1885
<i>South Carolina.</i>									
Kirkwood	Kershaw	3.27	22	6.83	+3.56				
Stateburg	Sumter	3.91	8	5.90	+1.99	5.90	1888	0.97	1887
<i>Tennessee.</i>									
Milan	Gibson	3.96	6	5.28	+1.32	5.28	1888	1.94	1885
<i>Texas.</i>									
New Ulm	Austin	4.92	16	2.72	-2.20	13.13	1882	1.27	1886
<i>Vermont.</i>									
Strafford	Orange	3.44	14	4.60	+1.16	7.10	1876	1.55	1878
<i>Virginia.</i>									
Bird's Nest	Northampton	4.59	19	8.55	+3.96	8.75	1884	1.70	1883
Wytheville	Wythe	3.64	23	2.73	-0.91	8.00	1884	1.50	1879, 1885
<i>West Virginia.</i>									
Helvetia	Randolph	4.65	12	4.38	-0.27				

#### EXCESSIVE PRECIPITATION.

Table showing for the month of March monthly rainfalls of 10 inches, or more; rainfalls of 2.50 inches, or more, in any 24 consecutive hours; and rainfalls equaling or exceeding one inch in one hour.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
<i>Alabama.</i>		<i>Inches.</i>			<i>Inches</i>			<i>h. m.</i>	<i>Inches</i>
Carlowville	1874	12.81	1874	15-18	10.46				
Carrollton	1888	10.47							
Mobile	1872	12.76	1871	11	3.87				
Do.	1874	10.57	1872	24	6.46				
Do.	1881	10.41	1874	15	4.51				
Do.	1884	11.53	1875	11	2.53				
Do.	1886	14.62	1876	19	2.95				
Do.			1876	27	2.61				
Do.			1877	1	3.23				
Do.			1879	21	4.20				
Do.			1880	9	3.49				
Do.			1881	11	4.11				
Do.			1882	26	3.78				
Do.			1884	18	3.52				
Do.			1886	30	3.93				
Montgomery	1874	10.66							
Do.	1875	11.56	1874	15	2.72				

Table showing for the month of March, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Alabama—Continued.			Inches.						
Montgomery			1874	16	4.67				
Do.			1876	15	2.68				
Do.			1884	23	3.05				
Do.			1886	22	2.57				
Do.	1888	11.51	1888	26-27	7.24				
Auburn	1888	11.24	1888	27	4.84				
Newmarket	1888	10.75	1888	25-26	3.12				
Tuscumbia	1888	10.58	1888	25	3.46				
Union Springs	1888	13.48	1888	27	6.20				
Livingston	1888	10.99							
Talladega	1888	12.08	1888	24-27	9.15				
Greensborough	1888	11.20							
Troy	1888	12.50	1888	27	4.50				
Mount Vernon	1888	11.67	1888	27	3.90				
Valley Head			1888	26	3.65				
Florence			1888	26	2.60				
Gadsden			1888	27	4.80				
Arkansas.									
Little Rock			1880	2-3	2.70				
Mount Ida			1880	11	3.20				
California.									
Los Angeles	1884	12.36	1884	3-4	3.18				
Do.			1884	6-7	2.67				
Sacramento			1884	9	2.94				
San Francisco			1879	4-5	3.31				
San Geronio			1876	4	3.01				
Connecticut.									
New Haven	1876	10.15	1876	25-26	4.78				
Do.	1881	10.42	1877	26-27	2.75				
Do.			1881	9-10	2.98				
Do.			1888	12	2.80				
New London	1877	10.96	1876	25	3.03				
Do.			1876	26	3.89				
Do.			1881	9-10	3.09				
Middletown			1888		3.07				
District of Columbia.									
Washington City			1878	12	2.60				
Florida.									
Archer	1880	12.32							
Barrancas, Fort	1878	10.75							
Do.			1878	10	3.25				
Do.			1878	11	3.18				
Do.			1878	27	2.80				
Do.			1879	19	3.65				
Do.			1880	14	2.84				
Do.			1878	28	4.95				
Saint Marks						1874	28	0 30	4.10
Biscayne	1886	12.14	1882	1	2.38	1882	1	1 40	2.38
Cedar Keys	1864	12.08							
Fernandina			1873	28-29	2.56				
Jacksonville			1885	21-22	2.58				
Do.						1877	3	1 10	1.20
Key West									
Pensacola	1886	13.37	1884	13	3.88				
Do.			1884	5	3.97				
Do.			1886	4	2.60				
Do.			1886	28	2.65				
Do.			1888	10	4.05	1888	10	1 00	1.22
Georgia.									
Atlanta	1880	11.87	1881	16-17	4.64				
Do.	1881	10.98	1881	18-19	3.12				
Do.	1886	11.16	1886	29	7.36				
Do.			1888	27-28	3.37				
Augusta	1872	10.88	1872	25	4.41				
Do.	1875	11.88	1874	15-16	3.00				
Do.			1881	16-17	3.45				
Do.			1882	27	2.83				
Do.			1886	28-29	4.84				
Do.			1888	20-21	2.86				
Savannah	1872	10.18	1872	1-2	4.08				
Do.			1875	19	2.99				
Forsyth			1880	11	3.10				
Do.			1880	19	2.90				
Do.	1888	11.50	1888	27	3.11	1888	27	1 00	1.91
Milledgeville	1888	10.81	1888	27	3.10				
Quitman			1888	27	2.55				
Gainesville			1880	9	2.65				
Illinois.									
Cairo			1876	11-12	2.63				
Chicago			1884	25-26	3.26				
Peoria			1859	28	3.29				
Marion			1887	5	4.00				
Indiana.									
Marengo	1888	11.05							
Huntingburg	1888	10.40							
Dana			1888	25	3.25				
Iowa.									
Dubuque			1886	20-21	2.67				
Kansas.									
Ellinwood			1876	5-6	3.14				
Hays, Fort	1876	14.44	1876	15	2.56				
Do.			1876	19	4.70				
Leavenworth						1865	20	5 00	6.00
Morse			1888	24	3.50				
Kentucky.									
Blandville			1874	18	3.50				
Louisiana.									
New Orleans	1875	10.84	1872	24-25	4.50				
Do.	1876	11.32	1875	11-12	2.75				
Do.			1875	29-30	3.81				
Do.			1876	19-20	3.98				
Do.			1876	27	3.72				

Table showing for the month of March, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
<i>Louisiana—Continued.</i>									
New Orleans		Inches.	1877	1	3.02				
Do.			1878	9	3.73				
Do.			1880	8-9	3.36				
Do.			1883	24	2.60				
Shreveport	1876	11.67	1876	11	2.81	1876	11	1 00	1.93
Do.			1876	19	4.46				
Do.			1878	8	4.50				
Do.			1886	26	2.71				
Baton Rouge			1878	9	3.50				
Clinton			1888	10	3.50				
Grand Coteau			1888	26-27	2.74				
Donaldsonville			1888	19	2.78				
Morgan City			1888	27	3.45				
Point Pleasant			1880	10	2.51				
Do.			1880	11	3.00				
Do.			1880	14-15	5.01				
Vidalia			1888	27	3.25				
<i>Maryland.</i>									
Baltimore			1881	9	3.51				
<i>Massachusetts.</i>									
Boston			1876	25-26	2.91				
Do.			1877	26-27	3.04				
Do.			1881	9-10	2.57				
Blue Hill Observatory			1888	12	2.87				
Lowell			1888	12-13	3.49				
Newburyport			1888	12-13	3.12				
<i>Mississippi.</i>									
Brook Haven	1876	11.20							
Coleman	1874	16.50							
Fayette	1874	11.20	1875	18-19	2.50				
Do.			1876	6	3.00				
Do.			1876	14-15	3.10				
Do.			1881	18	3.00				
Jackson	1874	10.08							
Do.	1875	10.16							
Do.	1876	10.94							
Vicksburg	1875	14.51							
Do.	1876	11.21							
Do.	1880	11.23	1880	14-15	4.63				
Do.			1875	31	3.26				
Do.			1876	6	2.84				
Do.			1878	9	4.46				
Palo Alto	1888	11.61							
West Point	1888	12.22							
Starkville	1888	11.15							
University			1888	25	3.13				
Bitoxi			1888	10	4.51				
<i>Missouri.</i>									
Saint Louis			1852	12	3.76				
Do.			1865	29-30	4.90				
<i>New Hampshire.</i>									
Hanover			1844	2	2.50				
<i>New Jersey.</i>									
Mount Washington	1877	11.64							
Do.	1878	10.66							
Do.	1882	14.52							
<i>New York.</i>									
Sandy Hook	1876	11.04	1888	11-13	5.00				
South Orange			1888	11-12	3.30				
Bordentown			1888	11-12	2.87				
Lambertville			1888	11-12	2.84				
Moorestown			1888	11-12	2.66				
New Brunswick			1888	11-12	3.20				
Somerville			1888						
<i>North Carolina.</i>									
Charlotte			1853	25-26	3.40				
Hatteras	1877	10.41	1875	15-16	2.50	1875	15	1 30	2.00
Do.	1879	12.77	1875	29	3.04	1877	26	1 00	1.39
Do.			1877	21-22	5.06				
Do.			1879	30	6.72				
Do.			1882	1	3.71				
Do.			1883	26	3.55				
Lenoir	1875	10.20							
Murphy	1875	14.10	1875	1	4.20				
Portsmouth	1883	10.13							
Statesville	1875	14.70	1888	28-29	4.04				
Wilmington			1871	30	2.87				
Do.			1882	27	5.26				
Do.			1884	25	3.53				
Do.			1886	31	3.37				
Chapel Hill			1888	21	2.62				
<i>Ohio.</i>									
Cincinnati			1882	19-20	2.54				
Tiffin			1874	12	2.75				
Ruggles			1878	14	2.60				
<i>Oregon.</i>									
Astoria	1875	16.56	1887	4-5	3.16				
Do.	1887	16.11							
Eola	1877	10.66							
Do.	1879	10.76							
Portland	1873	12.76							
Do.	1877	11.31							
Do.	1879	11.70	1879	23-25	8.05				
Stevens, Fort									
Philadelphia			1876	24-25	2.72				

Table showing for the month of March, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
<i>Rhode Island.</i>									
Bristol		<i>Inches.</i>	1888		<i>Inches</i>			<i>h. m.</i>	<i>Inches</i>
<i>South Carolina.</i>									
Charleston			1883	25-26	2.52				
Hacienda Saluda (Greenville).	1875	11.10							
Spartanburg	1875	12.25							
Do.			1875	2-3	4.90				
Do.	1888	10.05							
<i>Tennessee.</i>									
Chattanooga.	1880	12.16	1881	18-19	2.57				
Do.	1884	10.19	1884	4-5	2.59				
Do.	1886	12.77	1886	29-30	7.61				
Knoxville	1875	13.07	1875	1	2.73	1871	27	0 55	1.01
Do.	1884	11.93	1875	14-15	2.64	1875	15	0 49	1.00
Do.	1886	11.15	1875	27	2.50	1877	8	0 45	1.00
Do.			1884	4-5	2.70	1878	12	0 15	1.08
Do.			1886	29-30	5.56				
Memphis	1876	11.03	1871	26-27	3.22				
Do.			1876	23-24	3.35				
Do.			1880	12	2.75				
Do.			1882	5-6	3.84				
Do.			1887	6-7	3.00				
Nashville	1875	15	1875	15	2.55				
Do.	1880	12	1880	12	2.79				
Do.	1882	8-9	1882	3-4	3.46				
Fostoria.	1888	25	1888	25	3.58				
Cookeville	1888	25	1888	25	3.00				
Fayetteville.	1888	26	1888	26	3.23				
Watkins	1888	25	1888	25	2.50				
Ashwood	1880	12	1880	12	2.75				
Do.	1888	25	1888	25	3.58				
Lawrenceburg.	1888	26	1888	26	4.71				
Nunely	1888	27	1888	27	4.01				
Hohenwald.	1888	26	1888	26	3.52				
Savannah.	1888	25	1888	25	3.22				
Florence Station	1887	6	1887	6	2.85				
Austin.	1880	12	1880	12	2.74				
Greenville.						1885	27	0 15	2.00
<i>Texas.</i>									
Brownsville.			1877	27-28	2.72				
Do.			1882	24-25	2.83				
Clarksville	1874	10.50	1874	14	2.75	1878	27	1 00	1.00
Do.	1875	15.50	1875	14	3.25				
Do.			1875	28	6.00				
Do.			1876	23	3.00				
Galveston	1884	17-18	1884	17-18	2.96	1873	13	0 45	2.00
Do.			1876	14	1 10	1876	14	1 10	1.26
Rio Grande City.	1878	19-20	1878	19-20	2.72				
Terrell	1875	20.12	1876	5	6.00	1876	5	5 00	6.00
Do.			1876	19	4.00	1876	19	1 00	4.00
Do.			1876	24	4.00	1876	31	5 00	5.00
Do.			1876	31	5.00				
New Ulm	1880	21	1880	21	2.50				
Palestine	1888	3-4	1888	3-4	5.75	1888	3	1 00	1.47
Kingston Springs	1884	25	1884	25	0 30	1884	25	0 30	1.60
Melissa	1879	26	1879	26	3.50	1879	26	3 00	3.50
<i>Utah.</i>									
Mount Carmel	1877	10.00	1874	4	5.00				
<i>Vermont.</i>									
Brattleborough			1888	12	4.00				
<i>Virginia.</i>									
Cape Henry	1880	10.72							
Norfolk	1875	7	1875	7	2.78				
Capeville	1878	12	1878	12	2.80				
<i>Washington.</i>									
Bainbridge Island	1879	13.70							
Canby, Fort	1887	14.12							
Cathlamet.	1875	18.50							
Do.	1876	13.20							
Neah Bay	1879	23.83							
Do.	1886	12.90							
Do.	1888	11.37	1888	11-12	4.00				
Olympia	1879	14.44							
Do.	1887	10.60	1888	11-12	2.50				
Pysht	1887	12.43							
Do.	1888	10.55	1888	11-12	4.00				
Tatoosh Island	1886	10.89	1887	7-8	3.55				
Do.	1887	16.36	1887	6-9	3.79				
Do.			1887	9-10	2.65				
<i>Wisconsin.</i>									
Green Bay			1888	1-2	2.80				

as at Mobile, viz., about once in four years; Shreveport, La., Memphis, Tenn., and Charleston, S. C., with records of fifteen years, or more, show one each.

The sections of country in which daily rainfalls of 2.50, or more, inches have occurred in March are much the same as those for which the largest monthly rainfalls are given. These excessive daily rainfalls are shown to have been most frequent in Tennessee, Alabama, and Mississippi, and, as with the heaviest monthly rainfalls, the records at Mobile, Ala., show the largest number, viz., thirteen for a period of eighteen years. Along the New Jersey and southern New England coasts there have been recorded at a number of stations from one to three daily rainfalls in excess of 2.50 inches. In the Lake region and central valleys they have occurred at very few sta-

tions; Saint Louis, Mo., and Fort Hays, Kans., report two each, but no other station in these last-named districts show more than one, and at a majority of stations no such daily rainfalls have occurred. In California there were two at Los Angeles, and one each at San Francisco, Sacramento, and San Geronio.

The records for March show but few instances of rainfalls of one inch, or more, per hour, and the stations reporting same are sparsely located. Even in the Gulf States, where the excessive daily and monthly rainfalls have occurred with greatest frequency, there have been very few rainfalls reaching a rate of one inch per hour. The rainfall of 4.10 inches in thirty minutes at Biscayne, Fla., on March 28, 1876, is the heaviest shown by the records.

## WINDS.

The most frequent directions of the wind during March, 1888, are shown on chart ii, by arrows flying with the wind. In the Missouri, upper Mississippi, and Ohio valleys, Lake region, New England, the middle Atlantic states, and on the California coast the winds were west, northwest, or north; in the west Gulf states and southern slope, southerly; and in other districts, variable.

### HIGH WINDS (in miles per hour).

The maximum velocities of the wind for March, 1888, at Signal Service stations where the movements are registered, are given in the table of miscellaneous meteorological data. Other than the maximum velocities given in the table referred to, the following velocities of fifty, or more, miles per hour have been reported: Fort Canby, Wash., 60, sw., 11th; 56, w., 12th; 56, s., 13th; 63, s., 31st. Eastport, Me., 60, e., 12th. Mackinaw City, Mich., 58, se., 26th. Hatteras, N. C., 55, nw., 11th; 50, w., 22d. Fort Totten, Dak., 52, n., 19th. Block Island, R. I., 50, n., 13th.

### LOCAL STORMS.

Sedgwick, Sedgwick Co., Kans.: a local storm, having the characteristics of a tornado, occurred in this vicinity about 5.30 p. m. on the 1st. The storm was accompanied by rain and hail, and destroyed buildings west of here and at Newton, ten miles northeastward.

Another report of the above mentioned storm, received from Halstead, Harvey Co. (lying to the northward of Sedgwick county), states that it also passed through portions of Reno and Kingman counties, its general course being n. 55° e. At one point in the storm's path the soft earth was scooped out to a depth of one foot in a place twenty feet in diameter, and other instances of the violence of the storm are given.

Emporia, Linn Co., Kans.: a very heavy rain storm, accompanied by incessant lightning, began at 7 p. m. of the 1st and continued for about an hour. It is reported that the storm had the characteristics of a tornado at a point a few miles west of the city, where considerable damage was done.

San Francisco, Cal.: light and heavy rain, accompanied by small hail, fell alternately during the day of the 4th, and high winds prevailed from 12.55 until 1.55 p. m., reaching a maximum velocity of thirty-six miles per hour. Nearly all vessels in the harbor dragged their anchors during the storm, and many sustained damage from collision, etc. The barges "Victor" and "Hills Ferry," lumber-laden, were sunk; the steamer "Alice Garrett," with thirty-two persons in quarantine, parted her cables during the height of the gale and drifted towards the wharves, damaging her upper works and then capsizing; no lives were lost.

Galveston, Tex.: a light south wind prevailed during the afternoon of the 10th, and at 6.15 p. m. it shifted suddenly to north and attained a velocity of fifty miles per hour at 10.55 p. m.; the high wind continued until in the forenoon of the following day. This was the severest wind storm experienced

in this city since March 13, 1883, when a velocity of sixty-one miles per hour was recorded. Trees, chimneys, and telegraph wires were blown down during the storm.

Spring Hill, Montgomery Co., Ga.: during the early morning (about 4 a. m.) of the 21st a tornado passed in an easterly direction through Telfair county causing the destruction of a number of buildings and the loss of several lives in the vicinity of Lumber City. Reports indicate that this was a well-defined tornado, and numerous instances of the violent force of the wind usually accompanying such storms are given. Mr. A. M. Moses, postmaster at Tupper, Montgomery Co., states that articles of merchandise contained in stores that were destroyed at Lumber City were blown distances of ten to twenty miles.

Bobo, Gordon Co., Ga.: at about 11 p. m. of the 20th a tornado passed through this county, to the north of this place, moving in a northeasterly direction, its path ranging in width from one hundred to two hundred yards. It is reported that while in some places everything in the path of the storm was destroyed, in others the storm apparently lifted from the ground, leaving no evidence of its existence for several miles. The storm was accompanied by rain and hail.

Calhoun, Gordon Co., Ga.: at 10.30 p. m. on the 20th a tornado occurred at this place, moving in a direction from southwest to northeast, destroying numerous buildings and causing other damage. At about 11 p. m. on the above date a violent local storm occurred in the vicinity of Austell, Cobb Co.

Mr. W. A. Simpson, postmaster at Stockton, Loudon Co., Tenn., reports the following:

The track of the destructive storm which occurred about 10 p. m. March 20th was eight or nine miles east of this place. This storm appears to have been the same one that proved so destructive at Calhoun, Ga. It is reported that an empty barrel and a piece of copper-plate were found in the path of the storm in this county, marked "Calhoun, Ga.," supposed to have been carried by the storm from the latter place, more than one hundred miles from Stockton, which appears to have been in the western edge of the storm. There was heavy rain, almost incessant lightning, and a light fall of small hail here, but the wind was only of moderate force. The course of the storm was almost parallel to the trend of our mountain boundaries and valleys. It is probable that after the storm passed Calhoun it struck the southern extremity of the Unaka Mountains, which elevated it, in passing over them, to a considerable altitude, and that it did not descend to the earth until reaching Loudon county. This storm was one of the most violent that has ever occurred in this part of Tennessee; its course was from southwest to northeast, as is usual with storms in this section.

Loudon, Loudon Co., Tenn.: a destructive local storm or tornado, path about one-fourth of a mile in width, passed in an easterly direction, about three miles south of this place, at about 10.30 p. m. (local time) on the 20th. No serious damage was done outside the path of the storm, which was accompanied by small hail.

Trim Belle, Pierce Co., Wis.: at 3 a. m. on the 21st a strong gale began to blow from the west and continued all day from the same direction, subsiding about an hour after sunset. At 10.30 a. m. the wind velocity was estimated at more than fifty miles per hour.